

JVC

SERVICE MANUAL

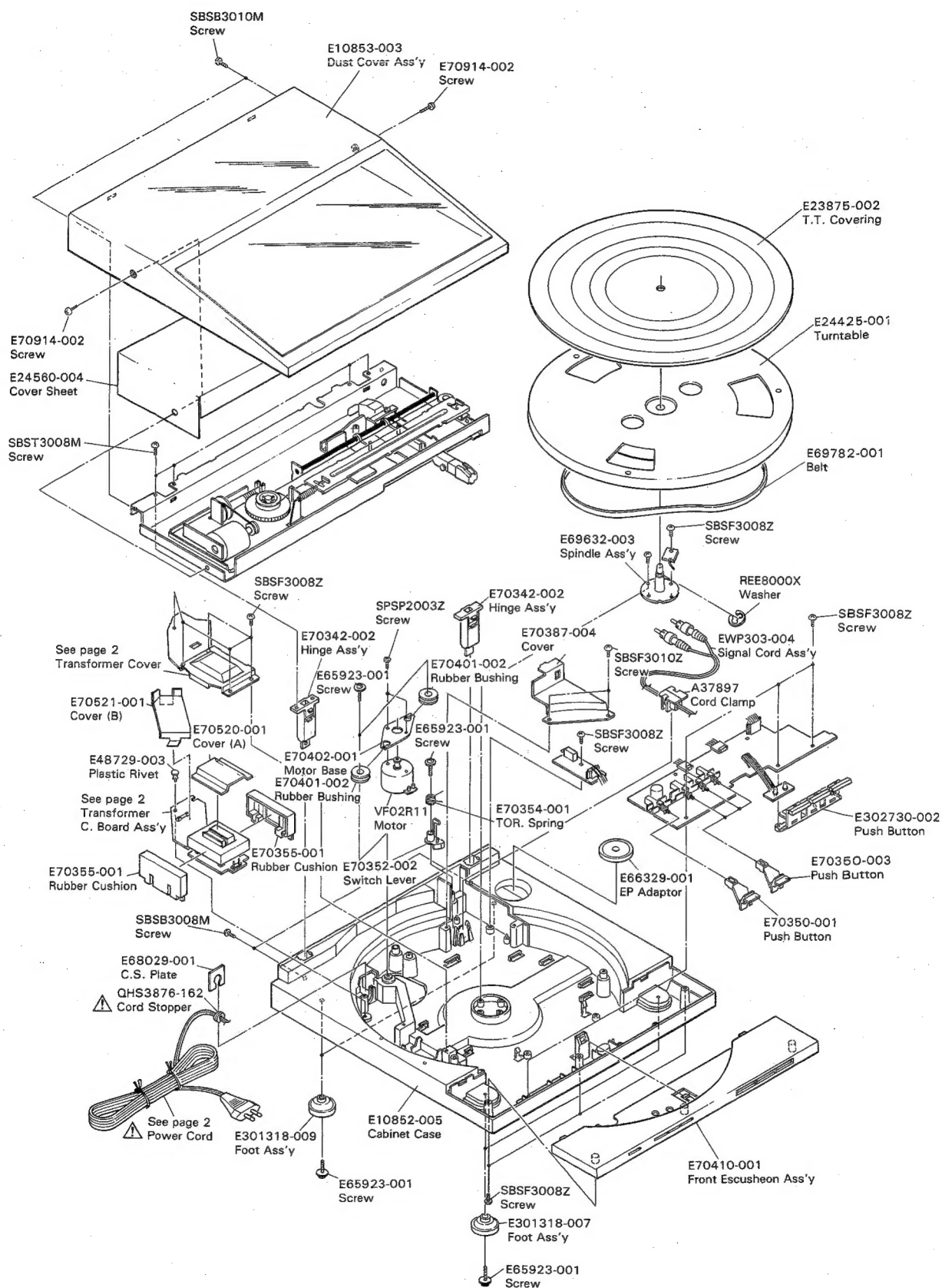
LINEAR TRACKING FULLY-AUTOMATIC TURNTABLE

MODEL **L-E22B**



This model has two types, silver type (Original) and black (New) type on the appearance.
When using this service manual, refer to the L-E22 service manual (No. 2672 Apr. 1983) published previously.

Exploded Views and Part Numbers



⚠ : Safety parts

Specified Numbers on the Appearance for Designated Types

| Description | Part Number | | Remarks |
|------------------|-------------------|-------------|---------|
| | Silver (Original) | Black (New) | |
| Dust Cover Ass'y | E10853-001 | E10853-003 | |
| Cabinet Case | E10852-001 | E10852-005 | |
| Cover Sheet | — | E24560-004 | |
| Cover | E70387-001 | E70387-004 | |
| Tonearm Ass'y | E24430-001 | E24563-001 | |
| Packing Case | PK-LE22 | PK-LE22B | |

Parts List with Specified Numbers for Designated Areas

| Item No. | Description | U.S.A. | Australia | Europe & West Germany | U.K. | U.S. Military Market & Other Countries |
|----------|------------------------------|-------------|-------------|-----------------------|---------------|--|
| 1 | Transformer P.C. Board Ass'y | END-006G | END-006C | END-006D | END-006BBS | END-006E |
| 2 | Transformer Cover | E302789-001 | E302789-001 | E302789-001 | E302789-001 | E302789-002 |
| 3 | Power Cord. ⚠ | QMP1200-200 | QMP2560-244 | QMP3900-200 | QMP9017-008BS | QMP7600-250 |

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SERVICE MANUAL

MODEL
L-E22

LINEAR TRACKING
FULLY-AUTOMATIC
TURNTABLE



No. 2672
Apr. 1983

Safety Precaution

1. The design of this product contains special hardware, many circuits and components specially for safety purposes.
For continued protection, no changes should be made to the original design unless authorized in writing by the manufacturer. Replacement parts must be identical to those used in the original circuits. Service should be performed by qualified personnel only.
2. Alterations of the design or circuitry of the product should not be made. Any design alterations or additions will void the manufacturer's warranty and will further relieve the manufacturer of responsibility for personal injury or property damage resulting therefrom.
3. Many electrical and mechanical parts in the product have special safety-related characteristics. These characteristics are often not evident from visual inspection nor can the protection afforded by them necessarily be obtained by using replacement components rated for higher voltage, wattage, etc. Replacement parts which have these special safety characteristics are identified in the parts list of Service manual. Electrical components having such features are identified by shading on the schematics and by (Δ) on the parts list in Service manual. The use of a substitute replacement which does not have the same safety characteristics as the recommended replacement part shown in the parts list in Service manual may create shock, fire, or other hazards.
4. The leads in the products are routed and dressed with ties, clamps, tubings, barriers and/or the like to be separated from live parts, high temperature parts, moving parts and/or sharp edges for the prevention of electric shock and fire hazard.
When service is required, the original lead routing and dress should be observed, and they should be confirmed to be returned to normal, after re-assembling.

5. Leakage current check

(Safety for electrical shock hazard)

After re-assembling the product, always perform an isolation check on the exposed metal parts of the Products (antenna terminals, knobs, metal cabinet, screw heads, earphone jack, control shafts, etc.) to be sure the product is safe to operate without danger of electrical shock.

Do not use a line isolation transformer during this check.

- Plug the AC line cord directly into the AC outlet. Using a "Leakage Current Tester", measure the leakage current from each exposed metal part of the cabinet, particularly any exposed metal part having a return path to the chassis, to a known good earth ground (water pipe, etc.). Any leakage current must not exceed 0.5 mA AC (r.m.s.).

● Alternate check method.

Plug the AC line cord directly into the AC outlet. Use an AC voltmeter having 1,000 ohms per volt or more sensitivity in the following manner. Connect a 1500 Ω 10 W resistor paralleled by a 0.15 μ F AC-type capacitor between an exposed metal part and a known good earth ground (water pipe, etc.). Measure the AC voltage across the resistor with the AC voltmeter.

Move the resistor connection to each exposed metal part, particularly any exposed metal part having a return path to the chassis, and measure the AC voltage across the resistor. Now, reverse the plug in the AC outlet and repeat each measurement. Any voltage measured must not exceed 0.75 V AC (r.m.s.). This corresponds to 0.5 mA AC (r.m.s.).

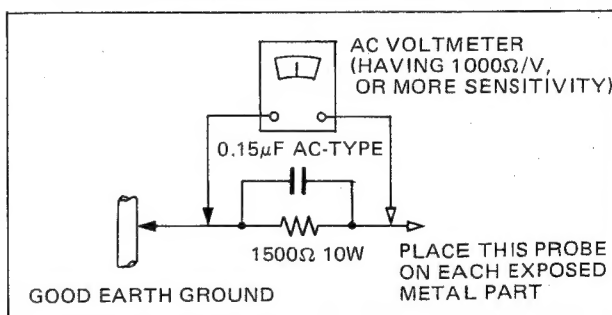
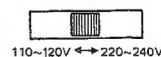


Fig. 1

CHECKING YOUR LINE VOLTAGE (For U.S. Military Market and Other Countries)

Before inserting the power plug, please check this setting to see that it corresponds with the line voltage in your area. If it doesn't, be sure to adjust the voltage selector switch to the proper setting before operating this equipment. The voltage selector switch is located on the cabinet.

CAUTION Before selecting the "Voltage selector switch" to proper voltage disconnect the power plug.



Features

- Linear tracking for zero tracking error
- Plug-in cartridge connector
- Compact size — only 34cm (13-3/8 inches) wide
- Electronically controlled fully automatic operation

Contents

| | | | |
|--|---|---|---------|
| 1. Specifications | 2 | 8. Exploded Views and Part Numbers | 7 |
| 2. Service Precautions | 2 | 8-(1) Platter and cabinet | 7 |
| 3. Name of Parts and Their Functions | 3 | 8-(2) Mechanism base ass'y | 8 |
| 4. Main Parts Location | 4 | 9. Printed Circuit Board Ass'y and Parts List | 9 |
| 5. Removal Procedures | 4 | 9-(1) ENL-006 main amp. power supply | |
| 5-(1) Replacement of stylus | 4 | & control P.C. board ass'y | 9 |
| 5-(2) Replacement of castridge | 4 | 9-(2) END-006 Transformer P.C. board ass'y | 10 |
| 5-(3) Removal of top cover | 4 | 10. Packing Materials and Parts Numbers | 11 |
| 5-(4) Removal of front escutcheon | 5 | 11. Accessories List | 11 |
| 6. Alignment Procedures | 5 | 12. Schematic Diagram | 12, 13 |
| 6-(1) Motor RPM adjustment | 5 | 13. Troubleshooting | 14 ~ 16 |
| 6-(2) Lead-in adjustment | 5 | 14. Parts List with Specified Numbers | |
| 6-(3) Tonearm following sensitivity adjustment | 5 | for Designated Areas | 16 |
| 7. Connection Diagram | 6 | | |

1. Specifications

MOTOR SECTION

| | |
|-----------------------|---------------------------------|
| Motor | : DC servo-motor |
| Drive system | : Belt drive |
| Speeds | : 33-1/3, 45 rpm |
| Wow and flutter | : 0.06 % (WRMS) 0.08 % (DIN) |
| Signal-to-noise ratio | : More than 60 dB (DIN-B) |

TONEARM SECTION

| | |
|------------------|---|
| Type | : Linear tracking statically balanced straight arm |
| Effective length | : 112 mm |
| Tracking error | : 0.3° |

CARTRIDGE SECTION (EXCEPT FOR U.S.A.)

| | |
|------------------------|--|
| Model | : MD1045 |
| Type | : Moving magnet (MM) |
| Frequency response | : 10 - 25,000 Hz |
| Output | : 2.5 mV (1 kHz 50 mm/s) |
| Channel separation | : 25 dB/1 kHz (test record: TRS-1) |
| Load resistance | : 47 kohms |
| Compliance | : 9×10^{-6} cm/dyne (Dynamic) |
| Stylus tip | : 0.6 mil conical stylus (diamond) |
| Stylus | : DT-45 |
| Optimum tracking force | : 1.25 g |

GENERAL

| | |
|------------|---|
| Dimensions | : 87(H) x 340(W) x 340(D) mm 3-7/16" (H) x 13-3/8" (W) x 13-3/8" (D) (Since the dimensions show only the design measurements, an allowance is required when installing the unit in a limited space such as a rack, etc.) |
| Weight | : 3.8 kg (8.4 lbs.) (without corrugated cardboard case) |

Accessory
See page 11.

Design and specifications subject to change without notice.

POWER SPECIFICATIONS

| Areas | Line Voltage & Frequency | Power Consumption |
|--------------------|--|-------------------|
| U.S.A. & CANADA | AC 120 V~, 60 Hz | 9 watts |
| CONTINENTAL EUROPE | AC 220 V~, 50 Hz | 9 watts |
| U.K. & AUSTRALIA | AC 240 V~, 50 Hz | 9 watts |
| OTHER AREAS | AC110~120/220~240 V~ selectable, 50/60 Hz | 9 watts |

2. Service Precautions

- (1) When replacing parts marked Δ , be sure to use the specified parts to ensure safety.
- (2) When removing the tonearm, motor, mechanism, etc., be sure to check or adjust the lead-in position.
- (3) When servicing the motor for proper speed, be sure to install it level.

3. Names of Controls and Their Functions



Fig. 2

① POWER switch

ON (I) : Press to its "in" position to turn on the power. The AUTO indicator will light.

STAND BY (II) : Press again to set to its "out" position to switch the power off.

Note:

- Even when the POWER switch is set to off, this turntable consumes a small amount of electricity (1 – 2 watts). To shut the power completely off, disconnect the power cord.

② SPEED SELECT button

Select the turntable speed as required.

③ SIZE SELECT button

Used for automatic selection of the position where the tonearm will descend and where playback will end according to the record.

④ REPEAT button

Press this button to replay a record (III). As long as the button is in this position, the record will be repeated continuously. To discontinue replay, press the button again (II).

⑤ MANUAL, AUTO indicator

Indicates manual playback when the MANUAL indicator lights, and automatic playback when the AUTO indicator lights.

⑥ UP/DOWN button

If this button is pressed during playback, the tonearm is raised and the MANUAL indicator will light to show that manual playback is being employed.

When manual playback is used, press this button to lower the tonearm after moving the tonearm using the "►" (START) and "◄" (STOP) buttons.

At the same time that the tonearm is lowered, the AUTO indicator lights to show that automatic playback is being employed, if this button is pressed when the tonearm is raised, the tonearm will be lowered; if it is pressed when the tonearm is lowered, the tonearm will be raised. It can be used to raise the tonearm to pause during the manual or automatic playback of a record.

⑦ START button (◄)

Press this button to start automatic playback.

For manual playback, hold this button pressed. When holding this button pressed, the tonearm will start to move and the indicator will change from AUTO to MANUAL; release this button at the desired position. The tonearm will stop at that position; now press the UP/DOWN button to start playback.

If this button is pressed during playback, the tonearm will move to the left automatically (◄) and return to the rest position; if the UP/DOWN button is pressed while the tonearm is moving, playback will start at that position. This allows it to be used for the playback of any tune (music scanning).

⑧ STOP button (►)

If this button is pressed during playback, the tonearm will move to the right (►) automatically and when it reaches the rest position, the turntable will stop.

If the UP/DOWN button is pressed while the tonearm is moving, playback will start again at that position, so this can be used for music scanning. When the tonearm stops in the up position (manual playback) the tonearm will move to the right (►) while this button is pressed.

⑨ EP adapter

Place the adapter on the center spindle when playing an EP with a large center hole.

4. Main Parts Location

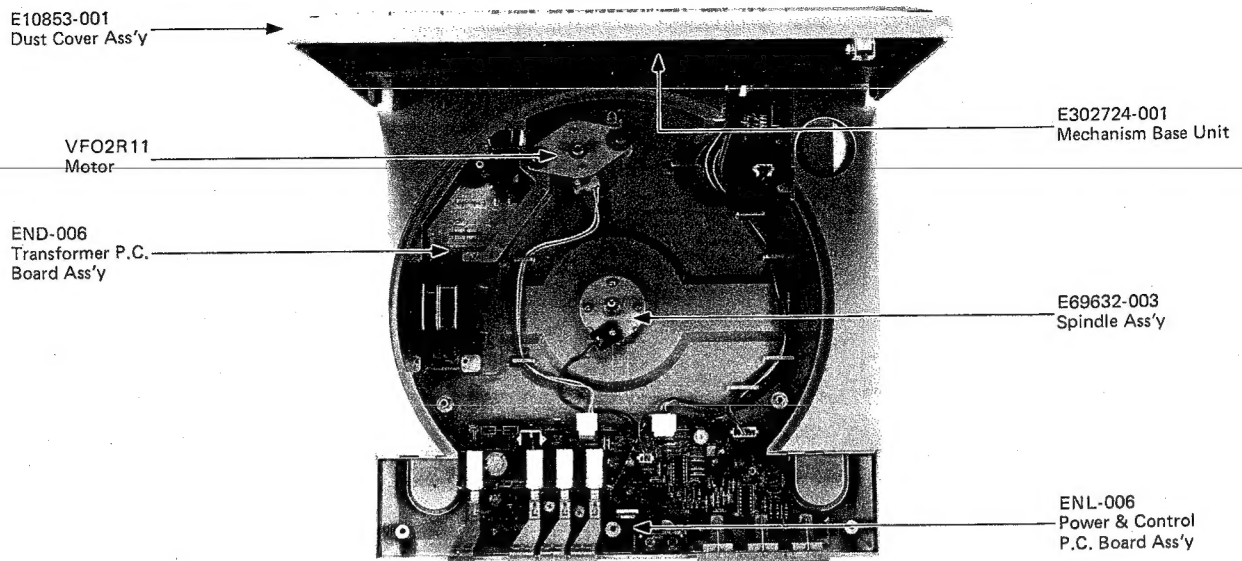


Fig. 3

5. Removal Procedures

5-(1) Replacement of stylus

How to remove the old stylus (Figs. 4 and 5)
Hold the cartridge and press the end of the stylus assembly in the direction of the arrow.

How to fit a new stylus

Being careful not to touch the stylus tip, fit the stylus assembly on the cartridge in the direction of the arrow.

Note: The service life of the stylus depends on conditions of use; the standard is between 800 and 1600 hours.

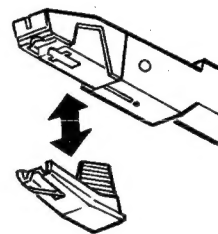


Fig. 4

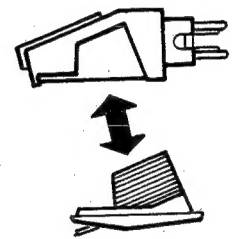


Fig. 5

5-(2) Replacement of cartridge

1. Remove the cartridge fixing screw (Fig. 6).
2. Pull the cartridge forward as shown in Fig. 7.

Note: • A plug-in cartridge is used for the L-E22. Therefore, specify a **T4P** type cartridge when purchasing a new cartridge.

- When replacing the cartridge, be sure to use the provided cartridge fixing screw to obtain the optimum tracking force.

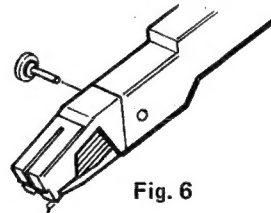


Fig. 6

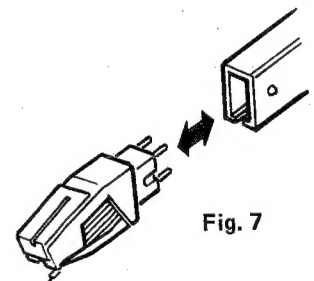


Fig. 7

5-(3) Removal of top cover

1. Remove screws ① and ② where located on both sides of the top cover as shown in Fig. 8.
2. Hold both sides of the top cover and pull it out upward.

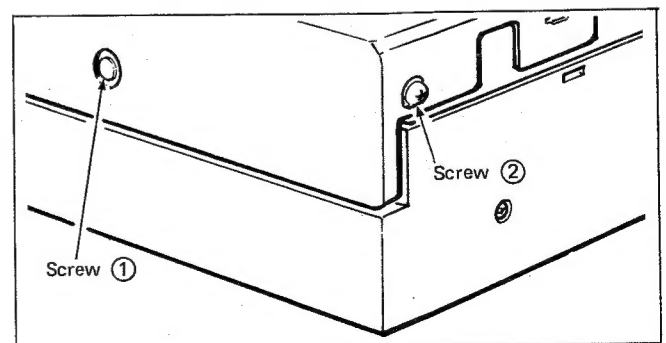


Fig. 8

5-(4) Removal of front escutcheon

1. Remove three screws on the back.
2. Undo the catch of front escutcheon by finger, then remove the front escutcheon in the direction of the arrow as shown in Fig. 9.

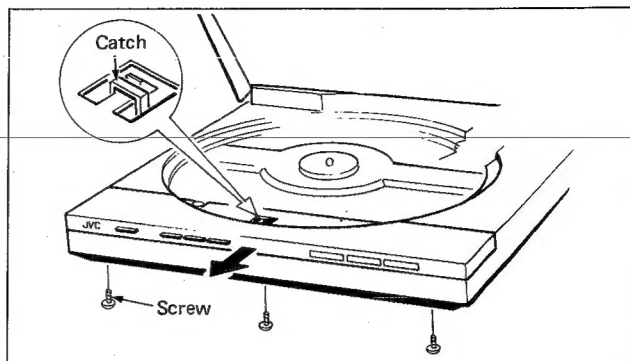


Fig. 9

6. Alignment Procedures

6-(1) Motor RPM adjustment

Turn the adjusting screw with a screwdriver inserted through the hole as shown in Fig. 10.

Turning counterclockwise permits increased RPM, while turning clockwise permits decreased RPM.

| RPM | Test record | Band | |
|-------------------|-------------|------------|---------------------|
| 33-1/3 rpm (R131) | SS-4141 | 1, 3 and 5 | 3150 Hz \pm 0.2 % |
| 45 rpm (R130) | SS-4141 | 2, 4 and 6 | 3150 Hz \pm 0.2 % |

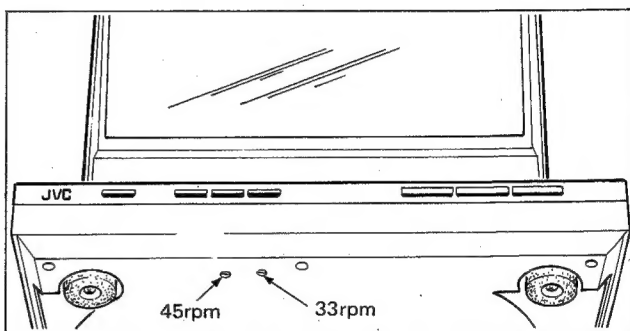


Fig. 10

6-(2) Lead-in adjustment

Adjust it with a screw shown in Fig. 11. Turning clockwise causes the position to shift outwards, while turning counterclockwise causes it to shift inwards.

| | Test record | Count | |
|----------------|-------------|-------------|------------|
| 30 cm lead-in | SS-4343 | 20 \pm 10 | Adjustment |
| 17 cm lead-in | SS-4445 | 20 \pm 10 | Check |
| 30 cm lead-out | SS-4445 | 16 \pm 4 | Check |
| 17 cm lead-out | SS-4445 | 26 \pm 4 | Check |

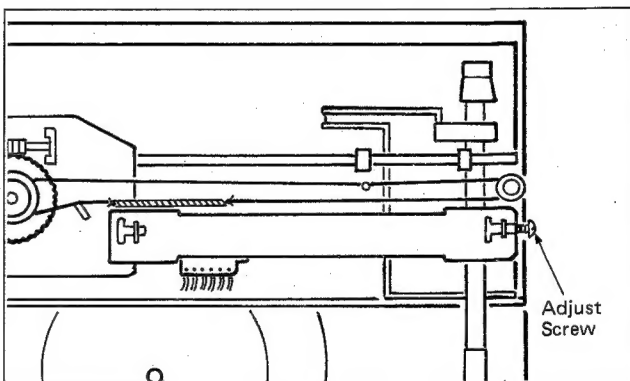


Fig. 11

6-(3) Tonearm following sensitivity adjustment

1. Remove the turntable.
2. With the tonearm at UP position, adjust it with VR(R124) shown in Fig. 12. The output voltage should be $3.7 \pm 0.2V$ between (1) and (2) of test point (TP101).

Note: Adjust the output to this voltage at a lapse of more than 3 minutes after power ON.

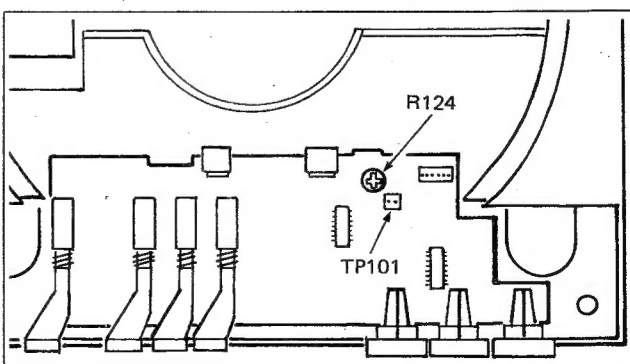


Fig. 12

7. Connection Diagram

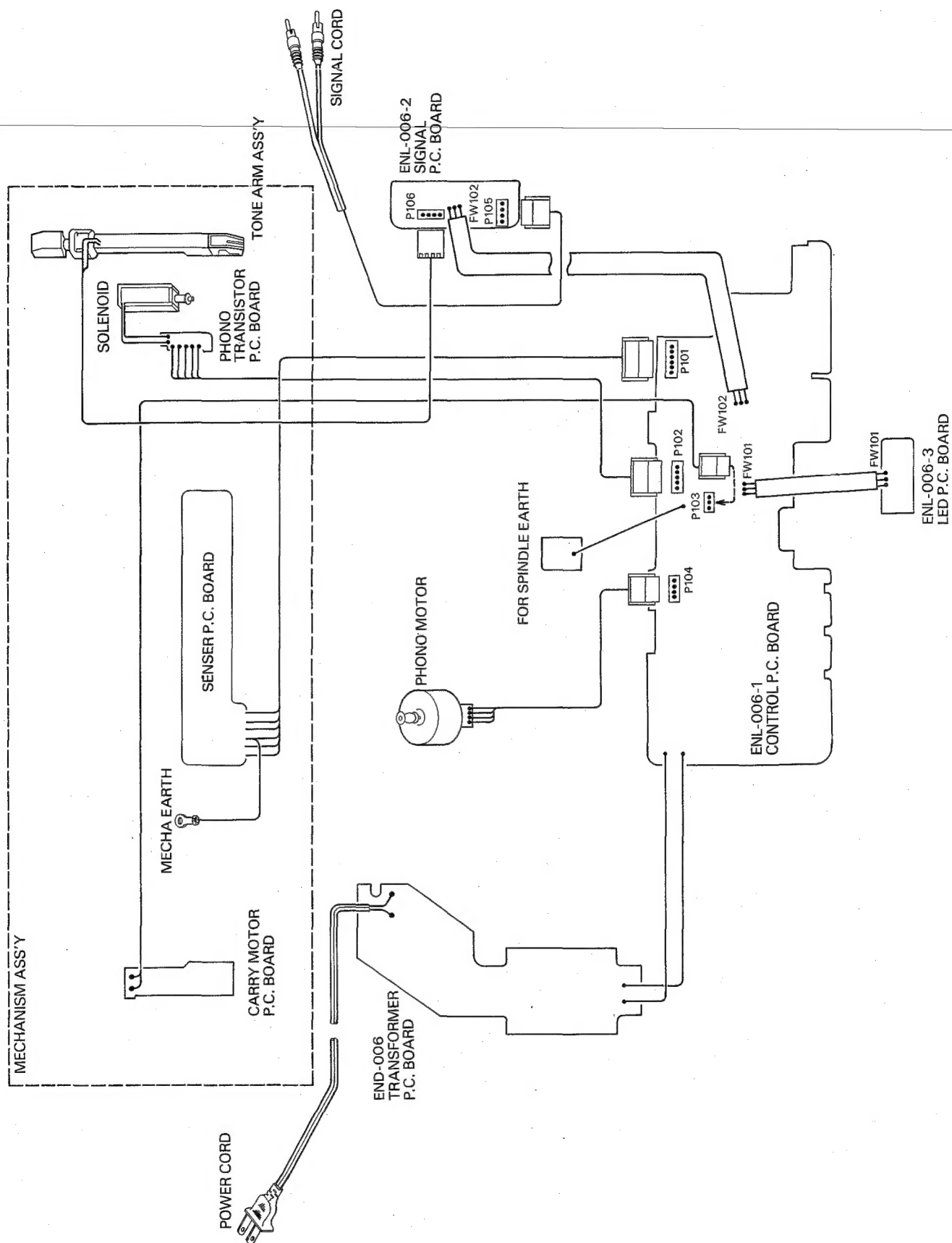


Fig. 13

8. Exploded Views and Part Numbers

8-(1) Platter and cabinet

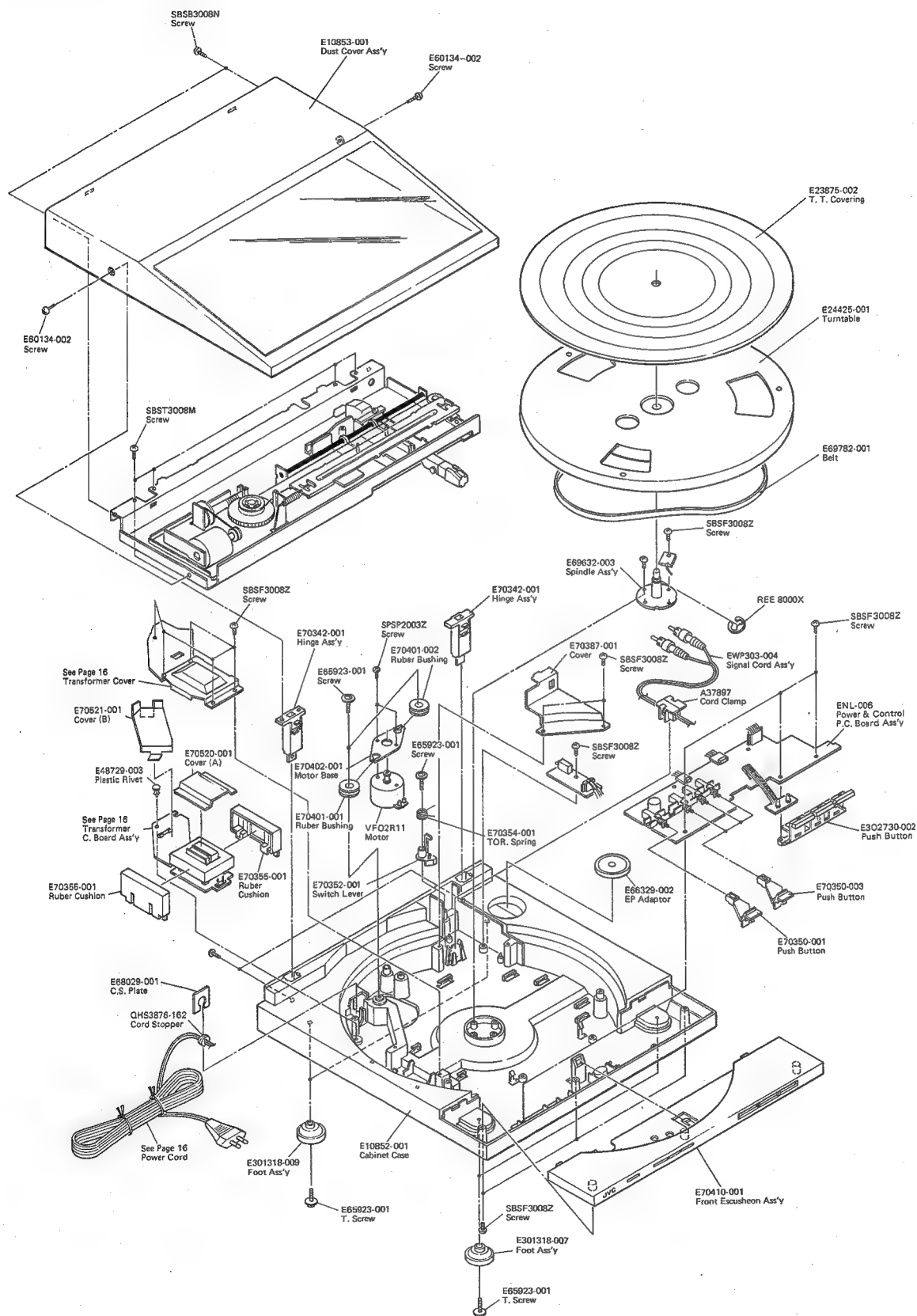


Fig. 14

8-(2) Mechanism base ass'y

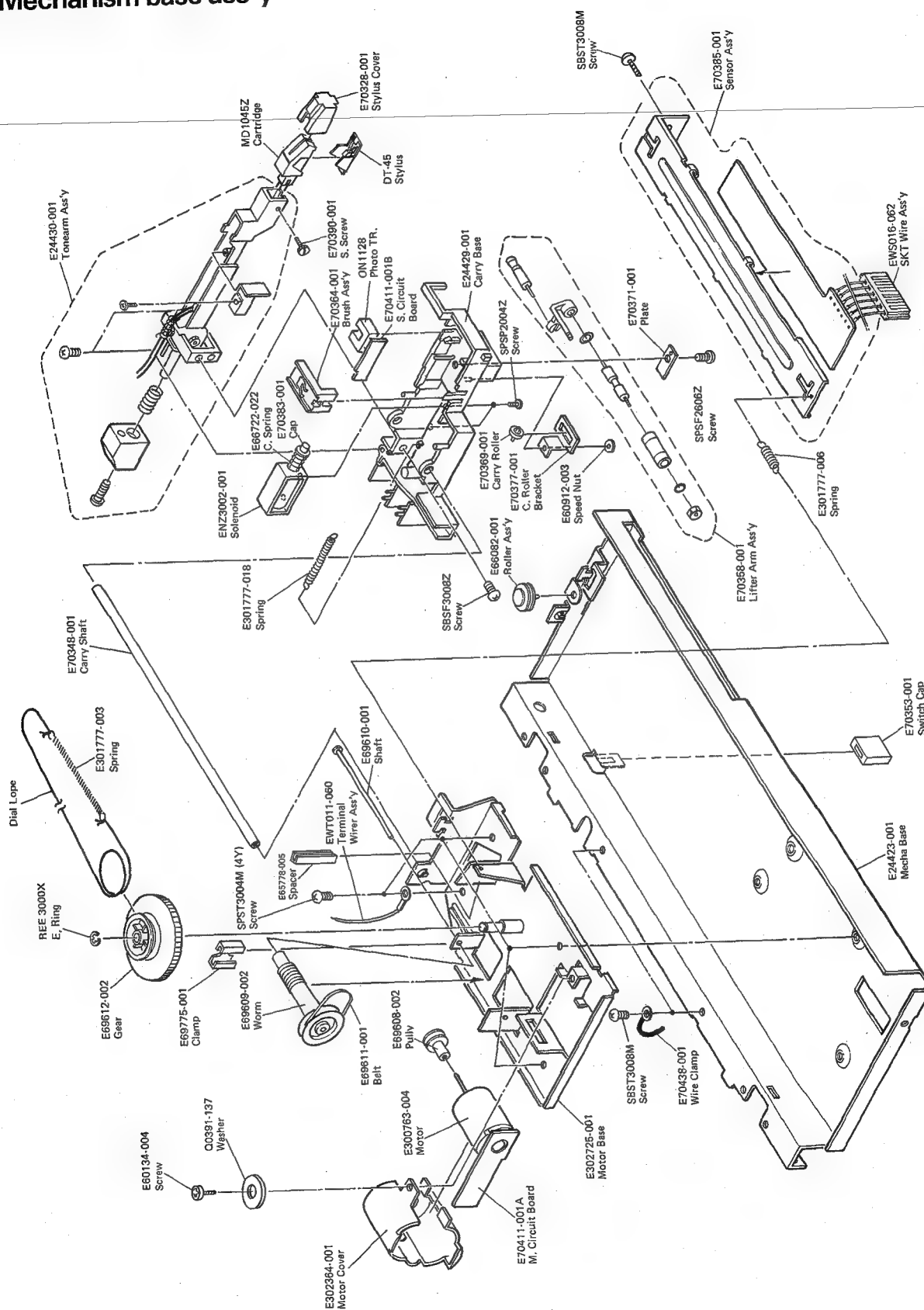


Fig. 15

9. Printed Circuit Board Ass'y and Parts List

9-(1) ENL-006 □ Main amp., power supply & control P.C. board ass'y

Note (1): The number of ENL-006 ☐ varies according to the area employed. See table below.

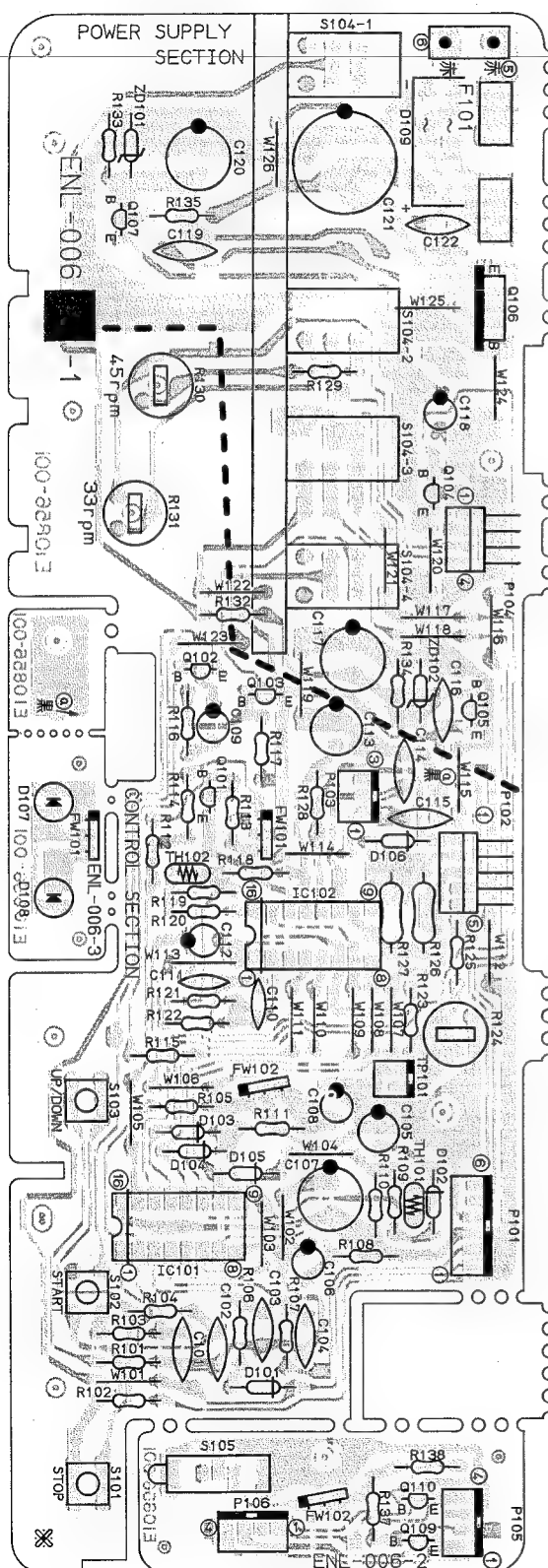
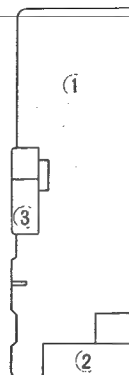


Fig. 16

Each Individual P.C. Board Location



- ① ENL-006□-1 :
Main amp., power supply
& control P.C. Board Ass'y
- ② ENL-006-2 :
Signal P.C. Board Ass'y
- ③ ENL-006-3 :
LED P.C. Board Ass'y

Note (1)

| | |
|-------------------------|-------------------------|
| Designated Areas | P.C. Board Ass'y |
| U.S.A. & Canada | ENL-006B |
| All Other Areas | ENL-006A |

Note (2)

The symbols (赤, 黒, 白 ... etc.) on P.C. Board surface are factory process only.

Transistors

| Item No. | Part Number | Rating | Description | |
|----------|---------------|--------|-------------|------------|
| | | | | Maker |
| Q101 | 2SC1685(Q,R) | | Silicon | Matsushita |
| Q102 | 2SC1685(Q,R) | | " | " |
| Q103 | 2SA733A(P,Q) | | " | NEC |
| Q104 | 2SD467(C) | | " | Hitachi |
| Q105 | 2SD468(C) | | " | " |
| Q106 | 2SD1265A(O,P) | | " | Matsushita |
| Q107 | 2SC1685(Q,R) | | " | " |
| Q109 | 2SD655(E,F) | | " | Hitachi |
| Q110 | 2SD655(E,F) | | " | " |

ICs

| Item No. | Part Number | Rating | Description |
|----------|-------------|--------|-------------|
| IC101 | M54981P | | Maker |
| IC102 | M54547P | | Matsushita |
| | | | " |

Diodes

| Item No. | Part Number | Rating | Description | |
|----------|-------------|--------|-------------|-----------|
| | | | | Maker |
| D101 | 1S2076-31 | | Silicon | Hitachi |
| D102 | 1S2076-31 | | " | " |
| D103 | 1S2076-31 | | " | " |
| D104 | 1S2076-31 | | " | " |
| D105 | 1S2076-31 | | " | " |
| D106 | 1S2076-31 | | " | " |
| D107 | TLG143 | | L.E.D. | Toshiba |
| D108 | TLR143 | | " | " |
| D109 | S1RBA20F1 | | Silicon | Sindenger |
| D110 | 1S2076-31 | | " | Hitachi |
| ZD101 | RD13EB3 | | " | NEC |
| ZD102 | RD6.2EB3 | | " | " |

Resistors

| Item No. | Part Number | Rating | Description |
|----------|---------------|------------|-----------------|
| R101 | QRD141J-471S | 470Ω ¼W | Carbon |
| R102 | QRD141J-471S | " " | " |
| R103 | QRD141J-472S | 4.7kΩ " | " |
| R104 | QRD141J-472S | " " | " |
| R105 | QRD141J-471S | 470Ω " | " |
| R106 | QRD141J-472S | 4.7kΩ " | " |
| R107 | QRD141J-472S | " " | " |
| R108 | QRD141J-333S | 33kΩ " | " |
| R109 | QRD141J-562S | 5.6kΩ " | " |
| R110 | QRD141J-102S | 1kΩ " | " |
| R111 | QRD141J-332S | 3.3kΩ " | " |
| R112 | QRD141J-223S | 22kΩ " | " |
| R113 | QRD141J-471S | 470Ω " | " |
| R114 | QRD141J-151S | 150Ω " | " |
| R115 | QRD141J-223S | 22kΩ " | " |
| R116 | QRD141J-223S | " " | " |
| R117 | QRD141J-223S | " " | " |
| R118 | QRD141J-153S | 15kΩ " | " |
| R119 | QRD141J-222S | 2.2kΩ " | " |
| R120 | QRD141J-121S | 120Ω " | " |
| R121 | QRD141J-223S | 22kΩ " | " |
| R122 | QRD141J-104S | 100kΩ " | " |
| R123 | QRD141J-223S | 22kΩ " | " |
| R124 | QVZ3501-223 | " " | Variable Carbon |
| R125 | QRD141J-101S | 100Ω ¼W | Carbon |
| R126 | QRG012J-101AM | " 1W | O.M. Film |
| R127 | QRG012J-101AM | " " | " |
| R128 | QRZ0061-4R7 | 4.7Ω ¼W | Fusible |
| R129 | QRD141J-102S | 1kΩ " | Carbon |
| R130 | QVP4A0B-222 | 2.2kΩ 0.1W | Variable |
| R131 | QVP4A0B-222 | " " | " |
| R132 | QRD141J-152S | 1.5kΩ ¼W | Carbon |
| R133 | QRD141J-102S | 1kΩ " | " |
| R135 | QRZ0062-220 | 22Ω " | Fusible |
| R136 | QRD141J-102S | 1kΩ " | " |
| R137 | QRD141J-222S | 2.2kΩ " | Carbon |
| R138 | QRD141J-222S | " " | " |

Capacitors

| Item No. | Part Number | Rating | Description |
|----------|-------------|-------------|-------------------------------|
| C101 | QCF21HP-223 | 0.022μF 50V | Ceramic |
| C102 | QCF21HP-223 | " " | " |
| C103 | QCF21HP-223 | " " | " |
| C104 | QCF21HP-223 | " " | " |
| C105 | QET51AM-107 | 100μF 10V | Electrolytic |
| C106 | QEB51HM-105 | 1μF 50V | Low Leak Current Electrolytic |
| C107 | QET51CM-107 | 100μF 16V | Electro |
| C108 | QET51AM-476 | 47μF 10V | " |
| C109 | QET51HM-105 | 1μF 50V | " |
| C110 | QCS21HJ-101 | 100pF " | Ceramic |
| C111 | QCS21HJ-101 | " " | " |
| C112 | QET51HM-225 | 2.2μF " | Electrolytic |
| C113 | QET51CM-107 | 100μF 16V | " |
| C114 | QCF21HP-223 | 0.022μF 50V | Ceramic |
| C115 | QCF21HP-223 | " " | " |
| C116 | QCF21HP-103 | 0.01μF " | " |
| C117 | QET51CM-227 | 220μF 16V | Electrolytic |
| C118 | QET51EM-106 | 10μF 25V | " |
| C119 | QCF21HP-103 | 0.01μF 50V | Ceramic |
| C120 | QET51CM-227 | 220μF 16V | Electrolytic |
| C121 | QET51VM-108 | 1000μF 35V | " |
| C122 | QCF21HP-223 | 0.022μF 50V | Ceramic |

Others

| Item No. | Part Number | Rating | Description |
|----------|-------------|--------|----------------|
| P101 | E67764-102 | | Terminal Ass'y |
| | EMG7331-001 | | Fuse Clip |
| P102 | E10856-001 | | Circuit Board |
| | QMV5005-006 | | 6P Plug Ass'y |
| P103 | QMV5004-005 | | 5P Plug Ass'y |
| P104 | QMV5005-003 | | 3P Plug Ass'y |
| P105 | QMV5004-004 | | 4P Plug Ass'y |
| P106 | QMV5005-004 | | " |
| S101 | ESP0001-007 | | Push Switch |
| S102 | ESP0001-007 | | " |
| S103 | ESP0001-007 | | " |
| S104 | QST4562-E01 | | " |
| S105 | QSP0029-001 | | " |
| TP101 | QMV5005-002 | | 2P Plug Ass'y |
| TH101 | SDT1000 | | Thermistor |
| TH102 | SDT1000 | | " |

Specified Numbers in END-006 for Designated Areas

| Item No. | Description | U.S.A. & Canada | Australia | Europe & West Germany | U.K. | U.S. Military Market & Other Countries |
|----------|-------------|-----------------|-------------|-----------------------|-------------|--|
| | Fuse Crip | — | EMG7331-001 | EMG7331-001 | EMG7331-001 | EMG7331-001 |

9-(2) END-006 □ Transformer P.C. board ass'y

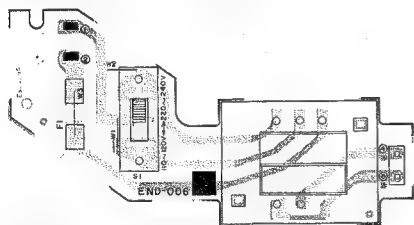


Fig. 17

| Designated Areas | P.C. Board Ass'y |
|--|------------------|
| U.S.A. & Canada | END-006A |
| U.K. | END-006BBS |
| Australia | END-006C |
| Europe & W. Germany | END-006D |
| U.S. Military Market & Other Countries | END-006E |

Specified Numbers in ENL-006 for Designated Areas

| Item No. | Description | U.S.A. & Canada | Australia | Europe & West Germany | U.K. | U.S. Military Market & Other Countries |
|----------|-------------------|-----------------|--------------|-----------------------|----------------|--|
| T001 | Power Transformer | ETP1000-18JA | ETP1000-18EA | ETP1000-18EA | ETP1000-18EABS | ETP1000-18LA |
| F1 | Fuse Crip | — | EMG7331-001 | EMG7331-001 | EMG7331-001 | EMG7331-001 |
| S1 | Slide Switch | — | — | — | — | QSS2228-103 |
| | Terminal Ass'y | E67764-102 | E67764-102 | E67764-102 | E67764-102 | E67764-102 |
| | Circuit Board | E302748-001 | E302748-001 | E302748-001 | E302748-001BS | E302748-001 |

10. Packing Materials and Parts Numbers

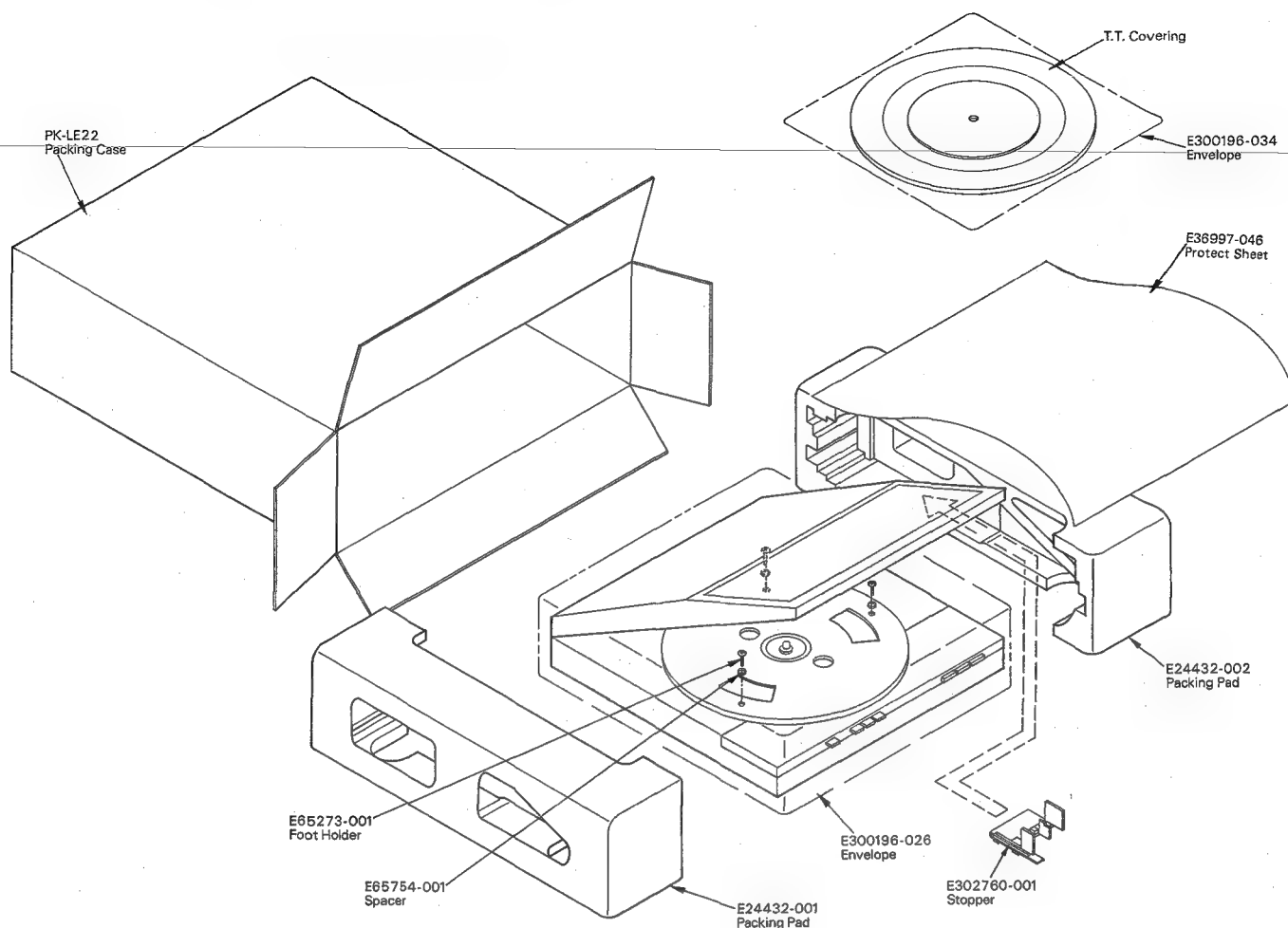
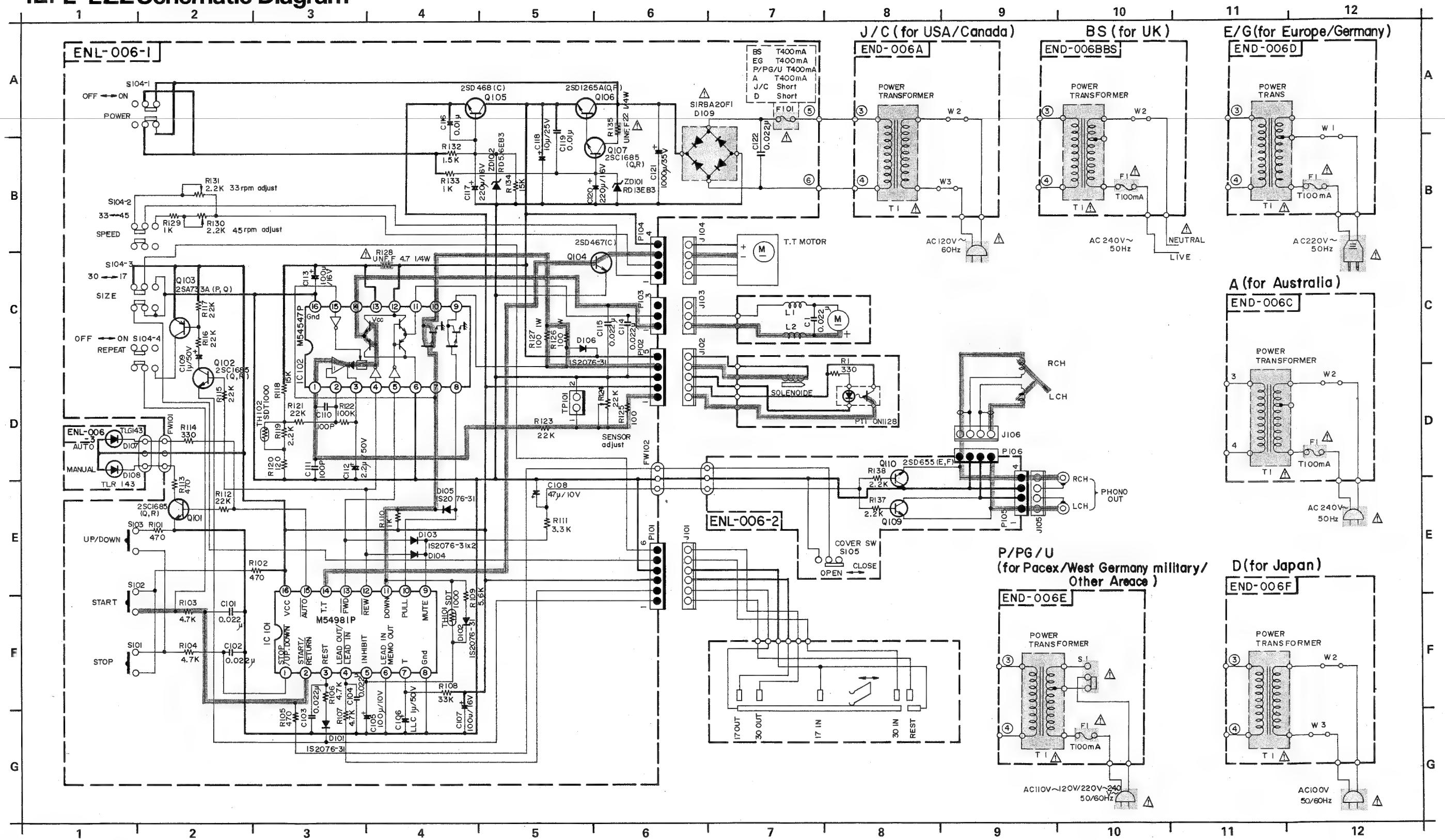


Fig. 18

11. Accessories List

| Item No. | Description | U.S.A. & (Canada) | Europe & (Australia) | West Germany | U.K. | U.S. Military Market & (Other Countries) |
|----------|------------------------------------|------------------------|-----------------------|--------------|----------------|--|
| | Instruction Book | E30580-1134A (") | E30580-1134A (") | E30580-1134A | E30580-1134ABS | E30580-1134A (") |
| | Warranty Card | BT20047A (BT20025F) | — (BT20029C) | BT20064 | BT20060 | BT20047A (—) |
| | Service Information Cord | BT20046B (—) | — | — | — | BT20046B (—) |
| | EP Adaptor | E66329-002 (") | E66329-002 (") | E66329-002 | E66329-002 | E66329-002 (") |
| | Siemens Plug | — | — | — | — | — (E04059) |
| | Safety Instruction | BT20044D (") | — | — | — | — |
| | Envelope (for Instruction Book) | E300196-010 (") | E300196-010 (") | E300196-010 | E300196-010 | E300196-010 (") |
| | Envelope (for Warranty Card) | E66416-003 (—) | — | — | — | — |

12. L-E22 Schematic Diagram



Notes:

1. — indicates positive B power supply.
2. ■ indicates signal path.
3. When replacing the parts in the darkened area (■) and those marked with Δ , be sure to use the designated parts to ensure safety.
4. This is the standard circuit diagram. The design and contents are subject to change without notice.

Q101, Q102, Q107
Q103
Q104
Q105
Q109, Q110

2SC1685(Q,R)
2SA733A(P,Q)
2SD467(C)
2SD468(C)
2SD655(E,F)

Q106 2SD1265A(Q,P)

- 12 -

D101 ~ D106
ZD101
ZD102

1S2076-31
RD13EB3
RD5.6EB3

PT1 ON1128

D107 TLG114
D108 TLR114

IC101 M54981P
IC102 M54547P

| MEASURED POINT MODE | IC101 | | | | | | | | | | | | | | | |
|------------------------|-------|------|------|------|------|---|------|---|------|------|------|------|------|------|------|------|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 |
| REST POSITION | 2.60 | 2.60 | 1.24 | 2.60 | 0.06 | 0 | 0.38 | 0 | 4.21 | 0.03 | 0.07 | 4.38 | 4.60 | 0.06 | 0.09 | 5.15 |
| PLAY MODE | 2.61 | 2.61 | 2.61 | 2.61 | 4.00 | 0 | 0.38 | 0 | 0.06 | 0.04 | 4.52 | 0.72 | 0.73 | 0.73 | 0.09 | 5.14 |
| ARM UP MODE | 2.61 | 2.61 | 2.61 | 2.61 | 0.05 | 0 | 0.37 | 0 | 4.22 | 0.03 | 0.06 | 4.58 | 4.61 | 0.73 | 3.40 | 5.15 |

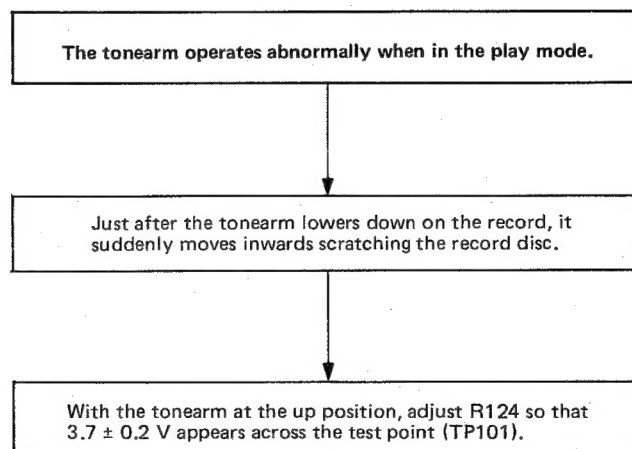
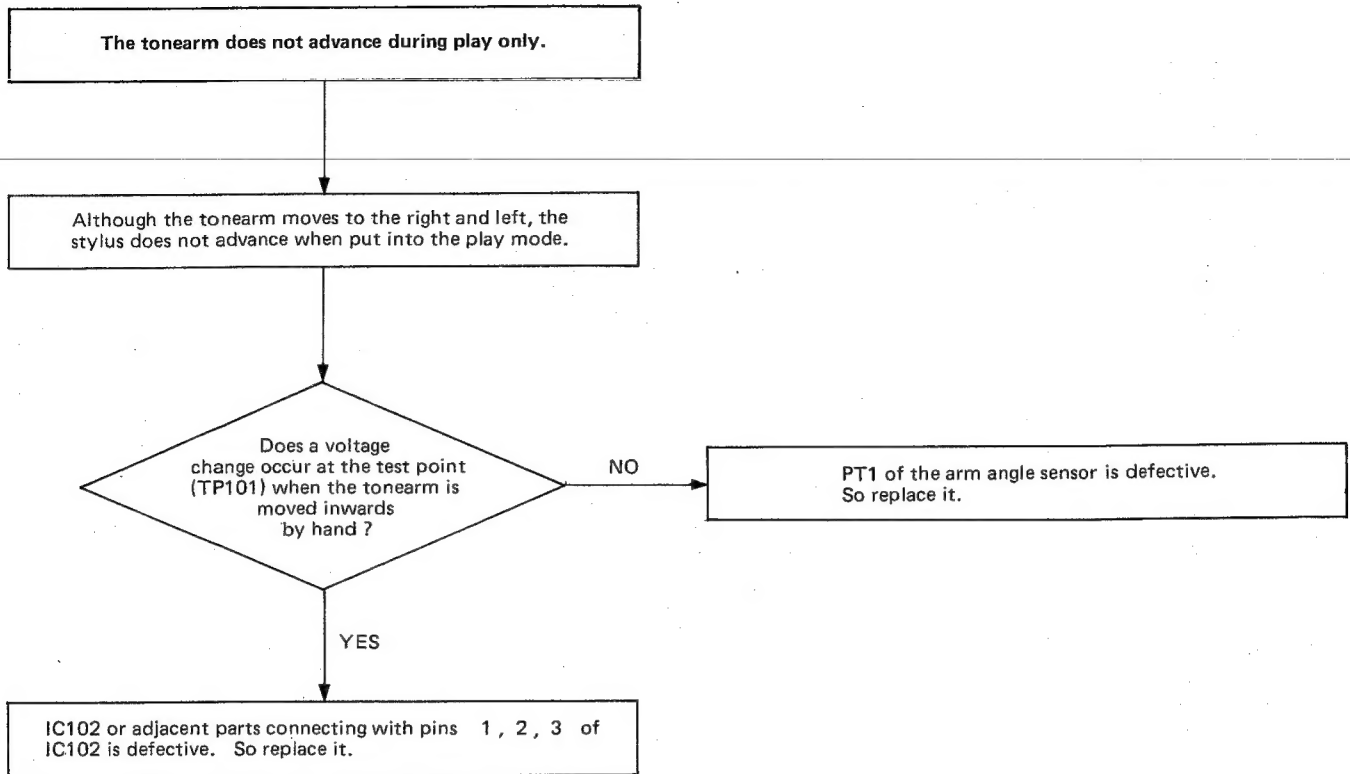
| MEASURED POINT MODE | IC102 | | | | | | | | | | | | | | | |
|------------------------|-------|------|------|------|------|---|------|------|------|------|------|------|------|------|------|----|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 |
| REST POSITION | 3.76 | 3.35 | 11.7 | 4.38 | 4.60 | 0 | 0.07 | 0.03 | 12.4 | 12.4 | 0.37 | 12.4 | 12.4 | 0.37 | 0.07 | 0 |
| PLAY MODE | 3.84 | 3.30 | 11.6 | 0.72 | 0.72 | 0 | 4.52 | 0.04 | 5.87 | 0.79 | 11.8 | 12.2 | 12.2 | 11.8 | 4.52 | 0 |
| ARM UP MODE | 3.78 | 3.33 | 11.7 | 4.58 | 4.61 | 0 | 0.06 | 0.03 | 12.4 | 12.4 | 0.37 | 12.4 | 12.4 | 0.37 | 0.06 | 0 |

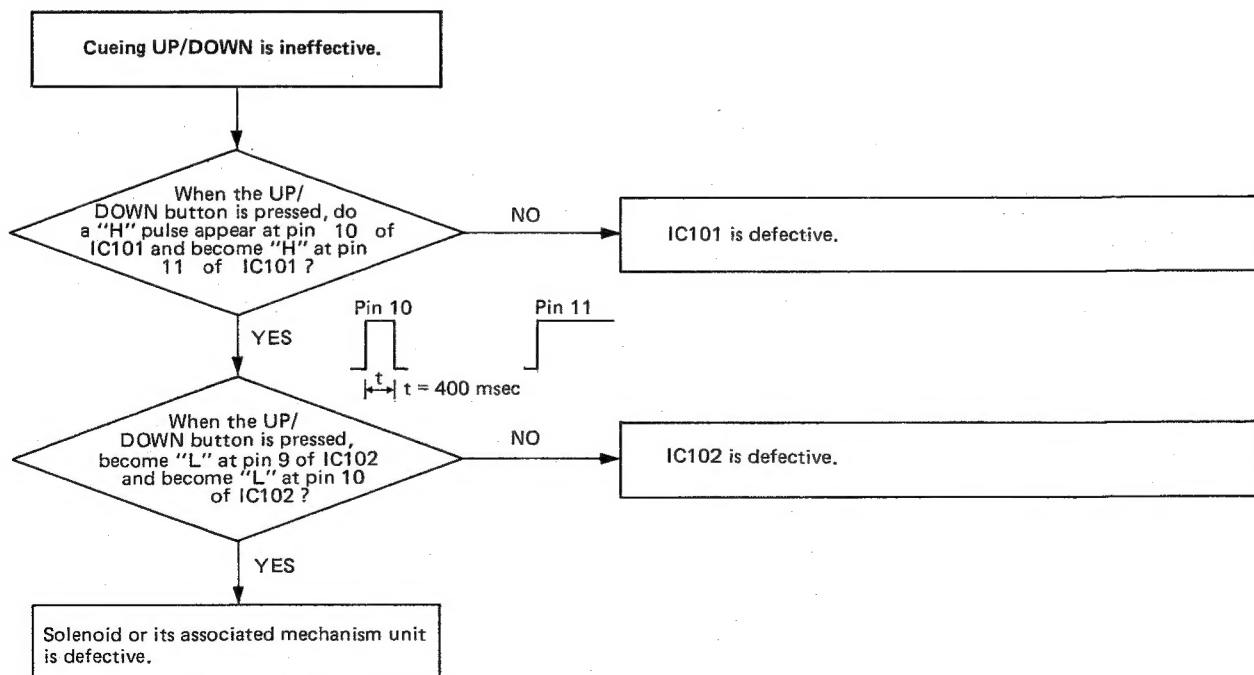
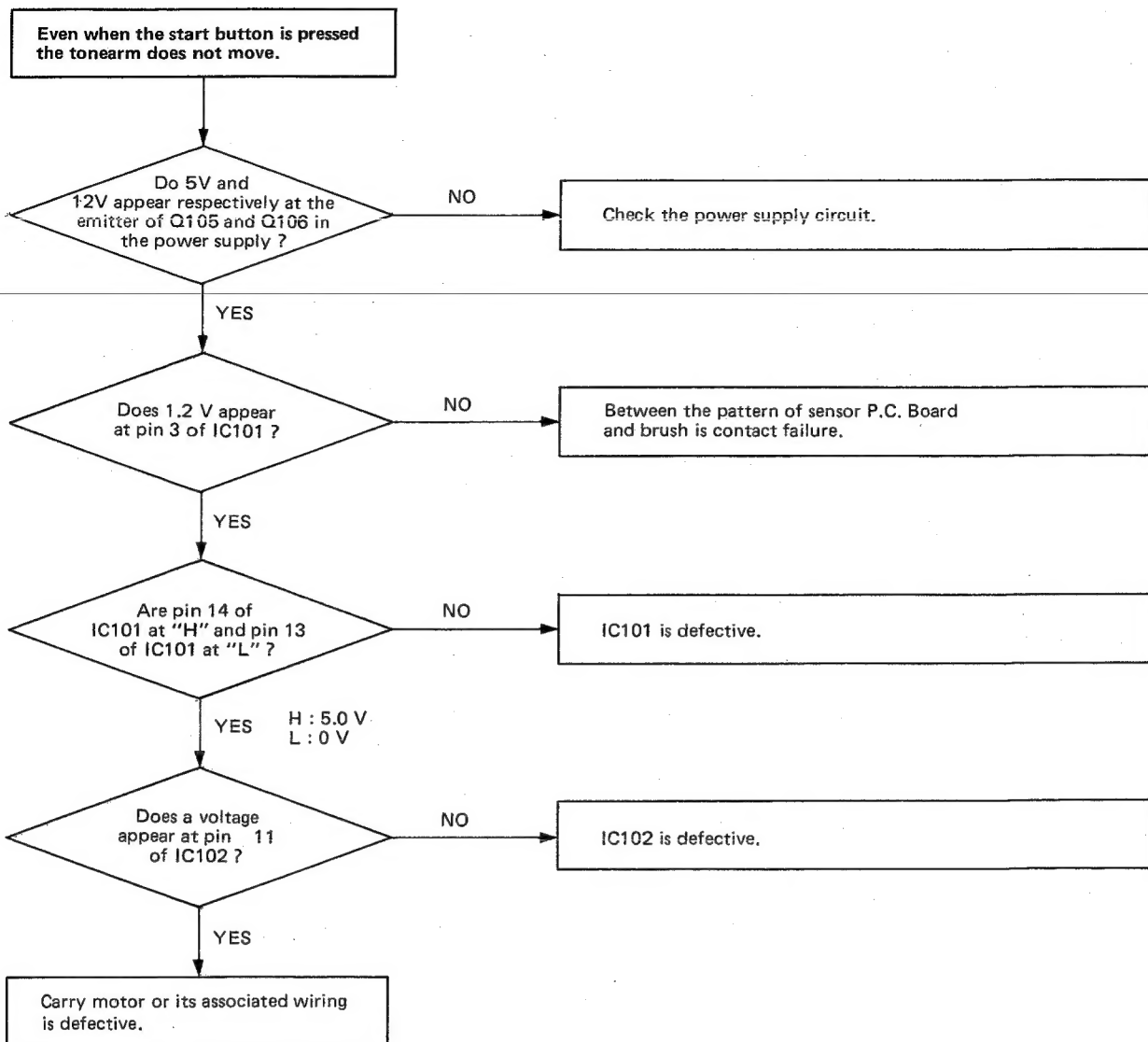
| MEASURED POINT MODE | Q101 | | | Q102 | | | Q103 | | | Q104 | | | Q105 | | |
|------------------------|------|------|------|------|------|------|------|---|------|------|------|------|------|------|------|
| | E | C | B | E | C | B | E | C | B | E | C | B | E | C | B |
| REST POSITION | 0 | 3.67 | 0.09 | 0.02 | 0.02 | 0.66 | 5.16 | 0 | 5.14 | 0 | 12.2 | 0.06 | 5.15 | 12.4 | 5.77 |
| PLAY MODE | 0 | 3.66 | 0.09 | 2.43 | 0.38 | 0.72 | 5.15 | 0 | 5.14 | 0 | 0.02 | 0.73 | 5.15 | 12.2 | 5.77 |
| ARM UP MODE | 0 | 0.08 | 0.69 | 4.12 | 4.12 | 4.57 | 5.15 | 0 | 5.14 | 0 | 0.01 | 0.72 | 5.15 | 12.4 | 5.77 |

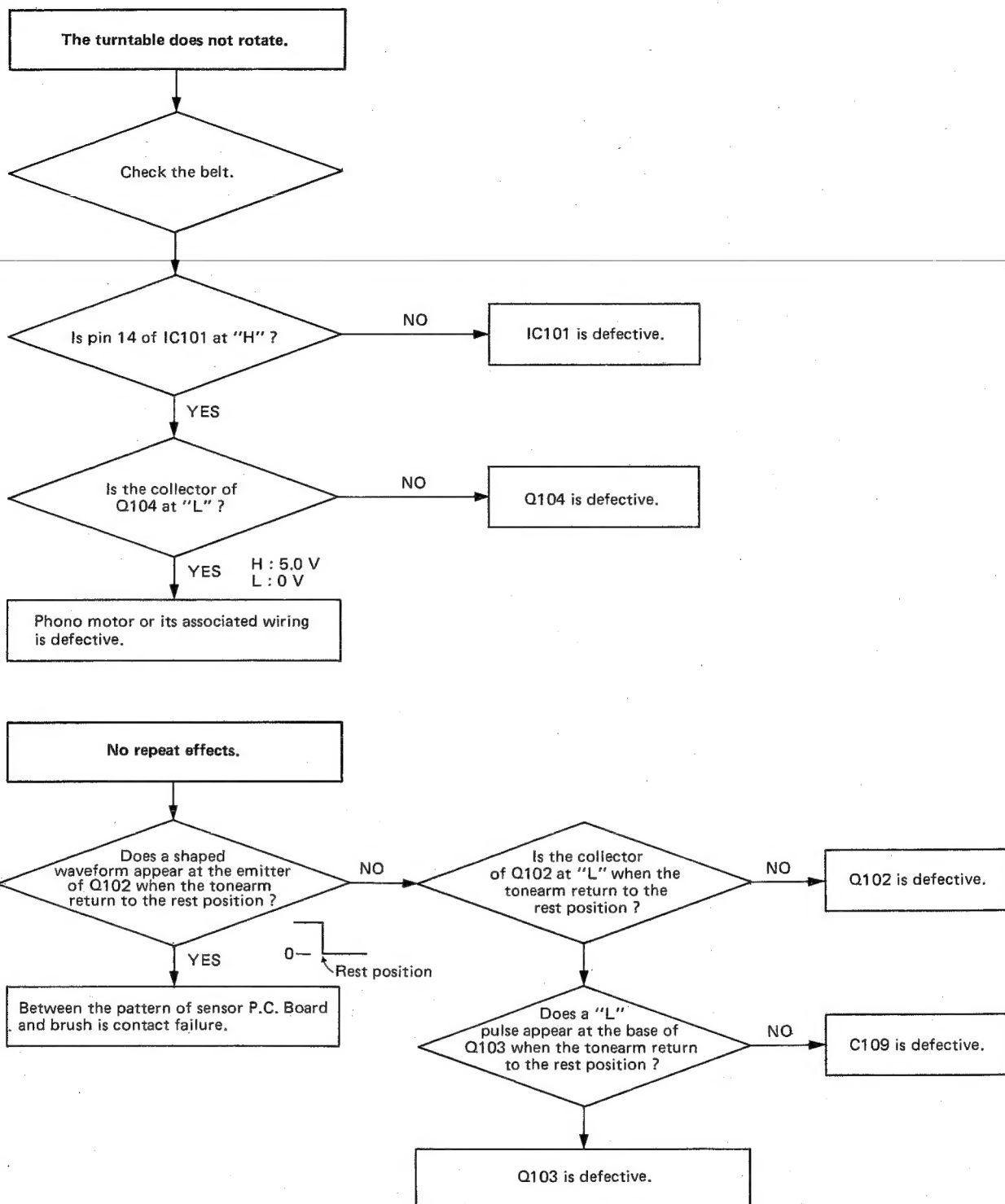
| MEASURED POINT MODE | Q106 | | | Q107 | | | Q109 | | | Q110 | | |
|------------------------|------|------|------|------|------|------|------|------|------|------|---|------|
| | E | C | B | E | C | B | E | C | B | E | C | B |
| REST POSITION | 12.4 | 20.1 | 12.9 | 12.9 | 20.1 | 13.5 | 1.69 | 1.69 | 2.09 | 0 | 0 | 0.68 |
| PLAY MODE | 12.2 | 16.9 | 12.8 | 12.8 | 16.9 | 13.4 | 0 | 0 | 0.06 | 0 | 0 | 0.06 |
| ARM UP MODE | 12.4 | 19.4 | 12.9 | 12.9 | 19.4 | 13.5 | 1.65 | 1.65 | 2.09 | 0 | 0 | 0.68 |

- Note
- Unit : Volt
 - Speed : 33 r.p.m.
 - Size : 30 cm
 - Repeat : OFF
 - Voltage Values are measured by a V.T.V.M.


13. Troubleshooting







14. Parts List with Specified Numbers for Designated Areas

| Item No. | Description | U.S.A. & (Canada) | Australia | Europe & West Germany | U.K. | U.S. Military Market & Other Countries |
|----------|---|----------------------|-------------|-----------------------|---------------|--|
| 1 | Transformer P.C. Board Ass'y | END-006A (") | END-006C | END-006D | END-006BBS | END-006E |
| 2 | Transformer Cover | E302789-001 (") | E302789-001 | E302789-001 | E302789-001 | E302789-002 |
| 3 | Power Cord.  | QMP1200-200 (") | QMP2560-244 | QMP3900-200 | QMP9017-008BS | QMP7600-250 |
| 4 | Cartridge Ass'y | — (MD1045Z) | MD1045Z | MD1045Z | MD1045Z | MD1045Z |
| 5 | Stylus | — (DT-45) | DT-45 | DT-45 | DT-45 | DT-45 |

 Safety Parts